I claim:

1. A holographic printer comprising:

(a) a source of coherent light;

(b) means for dividing said source into an object beam and a reference beam, said object beam having a beam path, said reference beam having at least one beam path;

(c) means, positioned along said object beam path, for positioning an image in said object beam path;

(d) means for supporting a recording medium in both said object beam path and said reference beam path; and

(e) means, positioned along said reference beam path between said dividing means and said recording medium support, for dividing said reference beam into a plurality of identical reference beams, each having its own path, each of said reference beam paths intersecting said object beam path at said recording medium support.

2. The printer of claim 1, wherein said means for dividing includes a plurality of optical fibers.

3. The printer of claim 2, wherein said object beam path, from said means for dividing to said recording medium support, has a given length, and wherein each of said reference beam paths, from said means for dividing to said recording medium support has said given length.

4. The printer of claim 3, wherein each of said plurality of fibers addresses said recording medium support from different angles.

5. The printer of claim 2, further including a fused optical fiber and means for dividing said fused optical fiber into said plurality of optical fibers.

6. The printer of claim 5, wherein said means for dividing is a polarization maintaining splitter array.

7. The printer of claim 2, wherein each of said plurality of fibers has an output end, each of said output ends being equally spaced from said recording medium support.

8. The printer of claim 7, further including means for supporting each of said output ends of said plurality of fibers.

9. The printer of claim 8, wherein each of said fiber support means includes means for holding said output end, means for adjusting the angular orientation of said output end relative to said recording medium support, and means for adjusting the distance between said output end and said recording medium support.

10. The printer of claim 1, further including shutter means.

11. The printer of claim 10, wherein said shutter means is non-mechanical.

12. The printer of claim 10, wherein said shutter means is a solid state means.

13. The printer of claim 10, wherein said shutter means is positioned between said source and said means for dividing, whereby when said shutter is opened, said recording medium support is simultaneously exposed to said object beam and said plurality of reference beams.

14. The printer of claim 10, wherein in said shutter means includes a plurality of shutter means, said plurality of shutter means including a shutter means positioned in said object beam path between said means for dividing and said recording medium

support, said plurality of shutter means also including a shutter means for each of said plurality of reference beams.

15. The printer of claim 14, further including shutter control means for controlling each of said plurality of shutter means, said shutter control means including means for sequentially opening each of said reference beam shutter means, said means for opening also including means for opening said object beam shutter each time one of said reference beam shutter means is opened.

16. The printer of claim 15, wherein said plurality of shutter means are non-mechanical.

17. The printer of claim 1, wherein said means for positioning an image includes means for holding a transparency.

18. The printer of claim 1, wherein said means for positioning an image is a liquid crystal panel.

19. The printer of claim 18, further including means for suppling images to said liquid crystal panel.

20. The printer of claim 19, wherein said means for supplying images includes computer means.

21. The printer of claim 20, further including a plurality of shutters, said plurality of shutters including a shutter positioned in said object beam path between said means for dividing and said recording medium support, said plurality of shutters also including a shutter for each of said plurality of reference beams.

22. The printer of claim 21, further including shutter control means for controlling each of said plurality of shutters, said shutter control means including

means for sequentially opening each of said reference beam shutters, said means for opening also including means for opening said object beam shutter each time one of said reference beam shutters is opened, said computer changing said image in said liquid panel between each sequential opening of said shutters.

23. The printer of claim 1, further including a holographic diffuser, said diffuser positioned in said object beam path adjacent said means for positioning an image.

24. The printer of claim 23, wherein said holographic diffuser element includes two elliptical holographic diffusers positioned relative to each other such that the principal axis of one is perpendicular to the principal axis of the other.

25. The printer of claim 1, wherein each of said plurality of reference beams includes means for beam manipulation.

26. The printer of claim 25, wherein each of said means for beam focusing is a cylindrical lens.

27. The printer of claim 26, further including means, positioned along said object beam path between said dividing means and said recording medium support, for dividing said object beam into a plurality of object beams, each having its own path, each of said object beam paths intersecting said reference beam paths at said recording medium support, each of said object beams further including beam focusing means in the form of cylindrical lenses.

28. The printer of claim 27, wherein said means for dividing includes a plurality of optical fibers.

29. The printer of claim 28, wherein each of said plurality of fibers has the

same length.

30. The printer of claim 29, wherein said means for dividing is a polarization maintaining splitter array.

31. A color holographic printer comprising:

(a) a plurality of sources of coherent light, each of said sources having a different wavelength;

(b) means for combining said different wavelengths into a single beam;

(c) means for dividing said single beam into an object beam and a reference beam, said object beam having a beam path, said reference beam having at least one beam path;

(d) means, positioned along said object beam path, for positioning an image in said object beam path; and

(e) means for supporting a recording medium in both said object beam path and said reference beam path.

32. The printer of claim 31, wherein said means for combining also includes a plurality of optical fibers, one for each source.

33. The printer of claim 32, wherein said means for combining also includes means for fusing said optical fibers.

34. The printer of claim 31, further including means positioned along said reference beam path between said dividing means and said recording medium support, for dividing said reference beam into a plurality of identical reference beams, each having its own path, each of said reference beam paths intersecting said object beam path at said recording medium support.

35. A holographic diffuser element including first and second elliptical holographic diffusers positioned relative to each other such that the principal axis of one of said diffusers is perpendicular to the principal axis of the other of said diffusers.

36. A method of forming a holographic image in a recording medium, said method including the steps of:

(a) providing a recording medium;

(b) providing an image;

(c) exposing said image and said recording medium to an object beam; and

(d) simultaneously with said object beam exposure, exposing said recording medium to plurality of reference beams.

37. A method of forming a holographic image in a recording medium with a printer having an object beam path and a plurality of reference beam paths, said method including the steps of:

(a) positioning a recording medium in both said object beam and said referenced beam paths;

(b) positioning an image in said object beam path;

(c) exposing said image and said recording medium to an object beam;

(d) simultaneously with said object beam exposure, exposing said recording medium to a first reference beam via one of said reference beam paths;

(e) changing said image;

(f) exposing said changed image and said recording medium with said object beam; and

(g) simultaneously with said second exposure of said object beam, exposing said recording medium to a second reference beam via another of said reference beam paths.

38. The method as set forth in claim 37, wherein after each exposure of said recording medium by said object beam, said image is changed, and wherein with each exposure by said object beam, said recording is simultaneously exposed to one of a sequence of different reference beams.